

# CRITICAL RAW MATERIALS

## MINING THE MODERN SCRAPHEAP: E-WASTE AS A STRATEGIC RESOURCE



### Breakthroughs in Metal Recovery Technologies

Discussions explored several recycling methods poised to transform e-waste recovery.

Traditional smelting, though dominant, remains energy-intensive and environmentally damaging. Hydrometallurgy provides a cleaner option but faces challenges around scalability and solvent costs. Ionometallurgy, a salt-based, low-temperature process, was presented as a promising, cost-competitive alternative capable of decentralised operations. Bioleaching, while innovative, was recognised as limited by slow processing speeds and scalability issues.

### Descycle's Ionometallurgy and UK Demonstration Hub

Technology company Descycle showcased its ionometallurgy process, which enables low-temperature, solvent-recycling metal recovery from e-waste in a closed-loop system. The company is constructing a UK demonstration facility at Wilton, Teesside, set to become operational by April next year.

The site will conduct multiple trials across various e-waste streams, testing scalability and commercial viability. The facility marks a major milestone toward developing decentralised recycling hubs across the UK and beyond, designed to process waste close to its source and maximise material value recovery.

### E-Waste Growth and Market Fragmentation

A recent meeting examined the mounting challenges and opportunities within the global and UK e-waste markets, with a particular focus on defence collaboration and emerging recycling technologies.

Experts highlighted that e-waste is among the fastest-growing waste streams worldwide, with the value of recoverable metals projected to hit \$120 billion globally and \$4 billion in the UK by 2030. Despite this, only 20% of e-waste metals are formally recycled.

Participants noted that the fragmented market—divided between upstream collectors and downstream smelters—restricts efficiency and deters investment. Defence representatives raised concerns about cataloguing and managing legacy equipment and stressed the need for greater data transparency to guide both policy and industrial engagement.

### Barriers to Commercialisation and Investment

Experts identified a series of hurdles preventing technologies from reaching industrial scale. Many promising solutions struggle to transition from laboratory success to commercial deployment due to high costs and technical risks.

A shortage of domestic investment—particularly for first commercial builds—was also cited, alongside regulatory uncertainty and skills gaps stemming from offshoring in metallurgy and chemical engineering.

Delegates emphasised that transparency, demand creation, and government-backed investment incentives are essential to building a sustainable UK recycling sector.

### Defence Sector Innovation and Data Collaboration

The defence sector outlined several ongoing initiatives to advance circular economy principles. These include efforts to quantify e-waste, develop digital product passports, and create data-sharing frameworks to improve tracking of materials throughout product lifecycles.

Working groups are being established to define performance metrics and standards for sustainable recycling. Collaboration with national innovation bodies aims to strengthen UK recycling infrastructure and guide investment priorities.

### Enabling Actions for the future

**Defence E-Waste Quantification:** Compile and share detailed records of defence e-waste types and volumes.

**Midstream Capability Mapping:** Share UK metals processing information to support programme development.

**Critical Minerals Directory:** Circulate a directory of UK projects and companies to support evidence gathering.

**E-Waste Technology Trials:** Engage with the Wilton demonstration facility to arrange e-waste trials.

**Circular Economy Standards:** Establish a working group to define and agree on performance metrics.

### Towards a Sustainable Circular Economy

The meeting underscored the critical intersection of innovation, policy, and collaboration in tackling e-waste. By combining defence sector data initiatives with cutting-edge recycling technologies, the UK aims to position itself as a global leader in sustainable materials recovery and industrial resilience.

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